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1122,998



# PATENT SPECIFICATION

DRAWINGS ATTACHED

1,122,998

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E1 B(4C3C, 4C3X, 4F1A, 4F1B, 4F5, 4G2)

Int. Cl.:—E 04 f 15/22

## COMPLETE SPECIFICATION

### A Composite Floor

We, FORSHAGA AKTIEBOLAG, formerly Linoleum Aktiebolaget Forshaga, a company organized under the laws of Sweden, of Göteborg, Sweden, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to composite floors. It is of importance that floors are not too "dead" as are concrete floors. "Dead" floors are said to be "hard on the feet" and can cause injury to persons who continually stand or walk on such floors, e.g. in factories, offices, shops and so on. Concrete floors are often very cool and this is the case especially when used at ground floor level in cellar-less or basement-less houses which constitute a great part of the houses built in recent times.

The invention resides in the provision, in a floor construction of a base including a solid foundation slab, a resilient layer consisting of a plurality of corrugated sheet sections overlying the base, and a support layer overlying the resilient layer and serving to support a floor covering, adjoining sections of the corrugated sheet overlapping one another at their margins extending parallel to the lengths of the corrugations with the free end edges of each pair of overlapping margins abutting the bottom and top respectively of a corrugation of the other margin.

By means of this construction there is obtained a floor with elasticity and which thus is healthy for the feet, which is, or can be ventilated, and also may be heated e.g. by means of hot air.

The invention will now be described in more detail with reference to the accompanying drawings. In the drawings:—

Figure 1 is a perspective view of a compos-

[P]

ite floor according to the present invention with the different layers partly uncovered;

Figures 2—5 show cross sections through floors according to the present invention illustrating different embodiments;

Figure 6 shows a cross section through a floor showing one form of joint;

Figure 7 illustrates the connection of prefabricated floor segments

Figure 8 shows the same sections as Figure 7 but after the jointing;

Figure 9 is a view from above of a floor according to the invention; and

Figure 10 shows the floor construction with a modified corrugated layer.

Figures 7, 8 and 10 show sections on the line A—A in Figure 9.

Referring now to Figure 1, the composite floor according to the invention comprises a base including solid foundation slab e.g. a concrete slab 1 carrying an insulating bed 2 which may comprise e.g. a fibre layer impregnated with bitumen or a tar-board. The insulating bed 2 serves as a bed for a resilient layer 3 consisting of a plurality of corrugated sheet sections which be made from hard resin, e.g. stiff polyvinylchloride (PVC) with a thickness of 0.5—1.5 millimeters. On the top of the layer 3 there is arranged an insulating layer 4 which with advantage comprises so-called "waffle board" impregnated with asphalt. On the top of the insulating layer 4 there is laid a relatively rigid support layer 5 for distributing pressures and this layer may comprise wood fibre boards, plywood, plaster plates, laminated plates or the like. Finally, there is arranged on the top of the layer 5 a floor covering 6, e.g. a linoleum covering, a covering of a textile material, parquetted floor or other material with great resistance to wear.

When a person walks on a floor according

to Figure 1 the floor has a "live" or resilient "feel" due to the resilient layer 3 which is capable of yielding to a minor degree in relation to the base. The further layers, especially support layer 5, distribute the load and layers 2 and 4 especially, contribute sound and heat insulation.

Due to the channels 7 and 8 provided in the resilient layer 3 there are obtained air layers which assist in heat insulation and which also render possible ventilation of the floor. Thus hot air could be passed through the channels 7 and 8 to warm the floor. A further advantage is to be seen in that the air channels 7 and 8 also give sound insulation which is of a special advantage when the floor construction separates different flats or apartments at different levels. In certain cases joints between adjacent sections of layer 3 may be taped to prevent intercommunication between adjacent air channels.

The floor construction thus incorporates the following very desirable properties: good resiliency, good heat and moisture insulation, good walking properties and permits the floor to be warm; moreover the thickness is not great, material requirements are small, and erection or assembly is easy.

Many modifications are of course possible particularly in the shape of the corrugated resilient layer 3. The resilience is primarily (for any given material and thickness) determined by the profile. Different profiles are illustrated in Figures 2—5. In Figure 2 there is shown a sheet having trapezoidal corrugations. According to Figure 3 the corrugations of the layer 3 are in the shape of a sinusoidal curve. According to Figure 4 the corrugations comprise successive arcuate portions of small radius. In Figure 5 there is shown a special construction in which the side-walls 9 of the corrugations are provided with longitudinal channels 10 which increase the resilience of the resilient layer 3. This construction is particularly suitable when the layer 3 is adhered to the bed 2 and possibly also to the layer 4 in allowing for lateral movements. In Figures 2—5 there are shown only some of the possible shapes for the resilient layer 3. The material of the layer 3 is not necessarily a resin but may be another material preferably with good resistance to ageing. Also a metal sheet or a metal foil which with advantage would be coated by a protective layer for preventing corrosion could be used for the resilient layer 3.

In the laying of the floor it has been discovered that certain difficulties can occur in connection with the arranging of the resilient layer 3, since it is necessary to have joints between the several sections. As shown in Figure 6, sections 11 and 12 form the layer 3 and overlap each other at the joint 13 where one section 12 with the vertically extending portion of its edge portion 15 engages the corresponding edge portion 16 of the other section 11. The

side wall 14 of the end corrugation is then reduced in height but only to such an extent that it abuts against the top 17 of the adjacent corrugation 16. The sheet section 12 is similarly treated so that the end of portion 18 is pressed against the bottom 19 of the corrugation 15. The sheet sections 11 and 12 are spaced so that a space 20 is provided between the portions 14 and 18. This transmits load applied near the joint to the two sections.

Further it secures the two sections together, but if desired the joint can be further improved by means of a tape 23, sealed across the joint, preferably a so-called industrial tape.

The plates 24, 25 (also referring to Figure 6) forming the relatively rigid support layer 5 are jointed in a way known *per se* by means of a tongue and groove joint 26 and this joint 26 is preferably reinforced by providing in the layer 3 an insert rib 27 having a cross section complementary to the corrugation of the layer 3 and disposed below, and spanning, the joint 26.

In many cases it might be advantageous to manufacture the construction according to the invention in pre-fabricated, glued segments and in this case the different segments are jointed on site in the manner described with reference to Figures 7—10.

In Figure 7 there are shown the marginal edge portions of two preassembled segments 28 and 29. These sections each comprise the different layers 1, 2, 3, 4<sup>1</sup>, and 6. In this connection it is pointed out that in the previously described embodiment of the invention the insulating bed 2 comprised a thin board whilst in Figure 7 it comprises a thick fibre plate impregnated with bitumen. Further, in the previously described constructions there was used an upper insulating layer 4 comprising board as well as a relatively rigid support layer 5 but in the present case these two layers have been combined in a single relatively rigid and insulating fibrous layer 4<sup>1</sup>.

According to Figure 7 the segment 28 is already in place and the segment 29 is to be connected. The segment 29 then takes initially the position indicated by means of dash and dot lines in which position a connecting rib 30 is inserted into a border groove 31 in the layer 4<sup>1</sup> of the segment 29. The segment 29 is then tilted so that its section of resilient layer 3, which projects beyond the other layer may be engaged with the likewise projecting portion 18<sup>1</sup> of the resilient layer section of the segment 28. The segment 28 and 29 are then slid together, and the joint rib 30 is engaged in the groove 32 in the carrying plate 4<sup>1</sup> of the segment 28. When put together, the segments 28 and 29 are in the position shown in Figure 8. The joint 33 which is formed in the floor covering 6 proper is preferably filled with a joint paste 34 which is ground level with the covering 6.

In Figure 9 there is shown a plan view of

the segments 28 and 29 and in this Figure there has been indicated a border groove 35 for joining the segments 28 and 29 with the next row of segments in a longitudinal direction.

The embodiment shown in Figure 10 corresponds to the embodiment shown in Figures 7 and 8 with the exception that the resilient layers are of different shape but engaged in a generally similar manner. This embodiment is particularly suitable for use as the floor or deck of a ship and may be made impervious to water. Moreover, if the corrugations are ventilated, internal condensation between successive layers of the floor construction is avoided, thus reducing the possibility of corrosion of metal parts, for example supporting steelwork, and this is particularly important in ships.

The invention has been described in the foregoing for purposes of illustration only and it is not intended to be restricted by this description or otherwise except as defined in the appended claims. As previously mentioned the layer 3 could be shaped with many different profiles and further, the pre-fabricated segments could be interconnected by alternative means.

#### WHAT WE CLAIM IS:—

1. In a floor construction, a base including a solid foundation slab, a resilient layer consisting of a plurality of corrugated sheet sections overlying the base, and a support layer overlying the resilient layer and serving to support a floor covering, adjoining sections of the corrugated sheet overlapping one another at their margins extending parallel to the lengths of the corrugations, with the free end edges of each pair of overlapping margins abutting the bottom and top respectively of a corrugation of the other margin.

2. A floor construction according to Claim 1, wherein the joint between each pair of said margins is strengthened by a tape.

3. A floor construction according to claim 1 or 2, comprising pre-fabricated segments, each segment including one respective corrugated sheet section and an overlying support layer section, the free end edges of said margins of each corrugated sheet section projecting beyond the corresponding edges of the overlying support layer section.

4. A floor construction according to Claim 1, 2 or 3, including an insulating bed between the base and the resilient layer.

5. A floor according to any one of the preceding claims, wherein the resilient layer is made of a synthetic resin.

6. A floor according to claim 5 wherein the resin is polyvinylchloride (PVC).

7. A floor according to claim 1, 2, 3, or 4 wherein the resilient layer comprises corrugated metal sheets.

8. A floor according to claim 7, wherein the metal sheets are coated with a protective material.

9. A floor according to any one of the preceding claims, wherein the corrugations are longitudinally channelled to increase resiliency.

10. A floor according to any one of claims 3 to 9 wherein adjacent segments are interconnected by ribs on one support layer section being inserted in grooves in the adjoining edges of the adjacent support layer sections.

11. A floor construction according to any one of the preceding claims, including an insulating layer between the support layer and the resilient layer.

12. A composite floor constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

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Fig.1

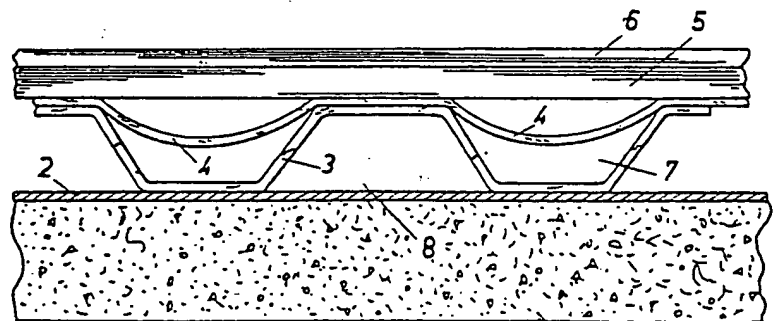
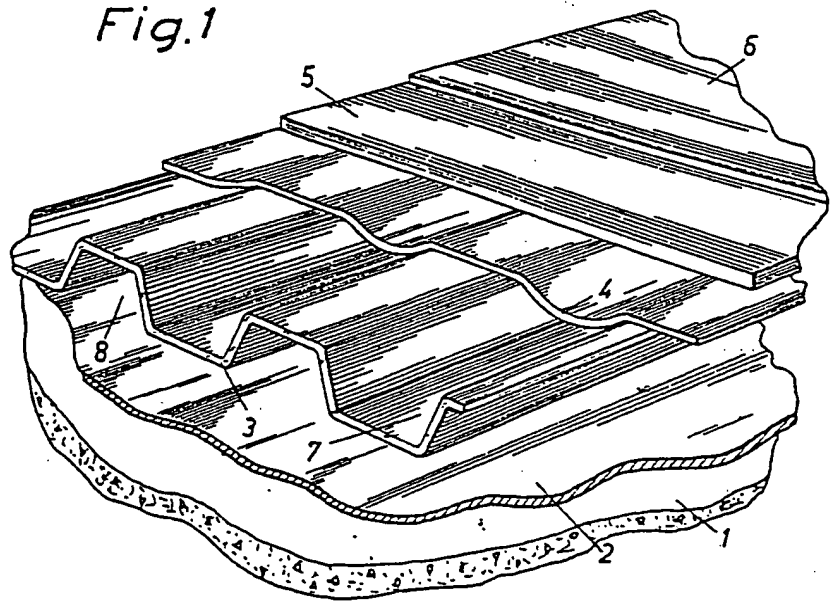


Fig.2

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COMPLETE SPECIFICATION

4 SHEETS

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Sheets 1 & 2

Fig.3

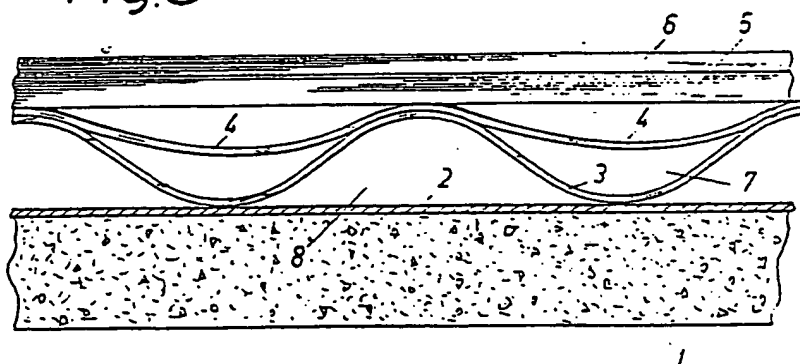


Fig.4

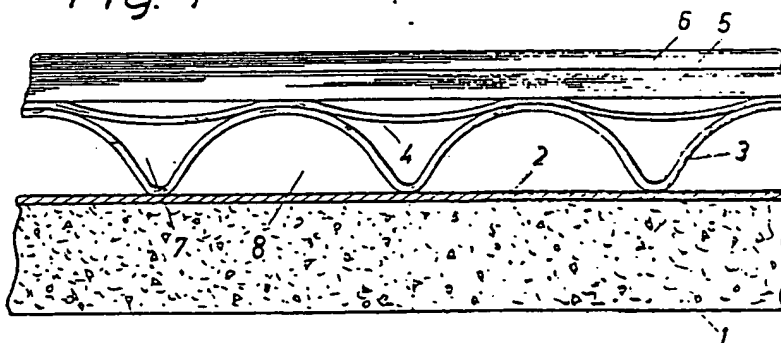


Fig.5

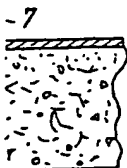
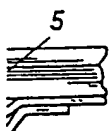
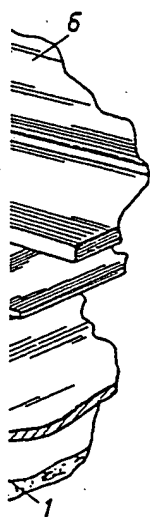
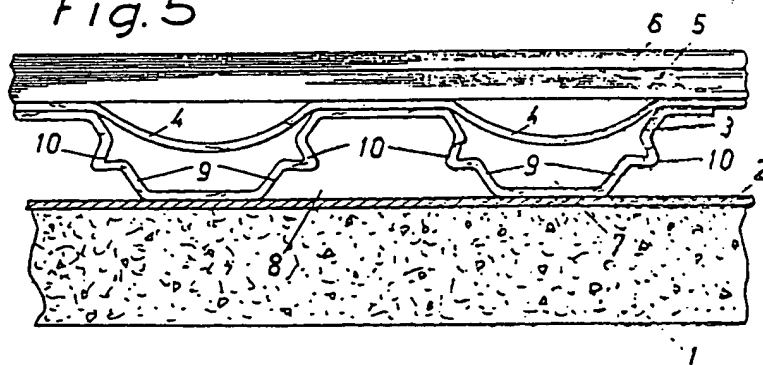


Fig.3

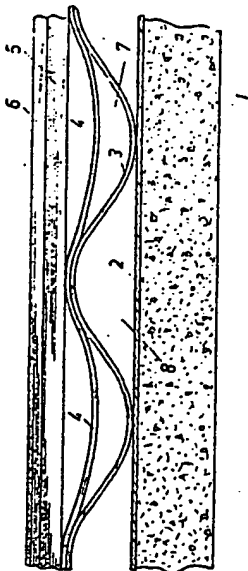


Fig.4

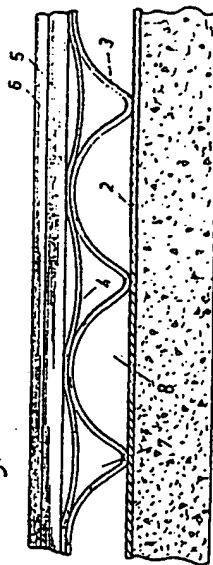


Fig.5

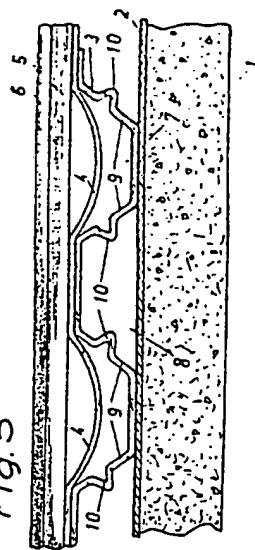


Fig.1

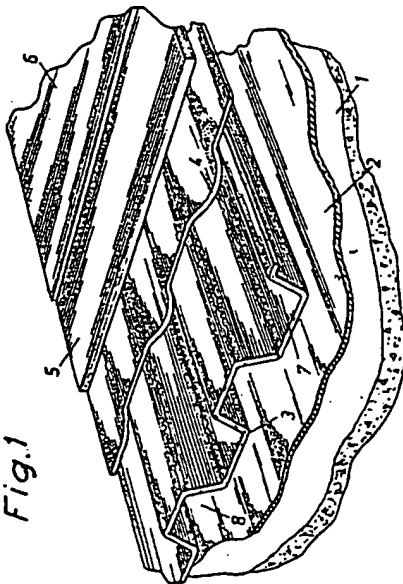
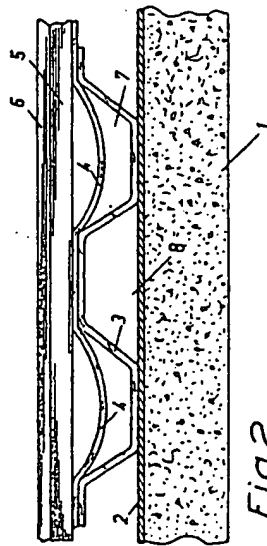
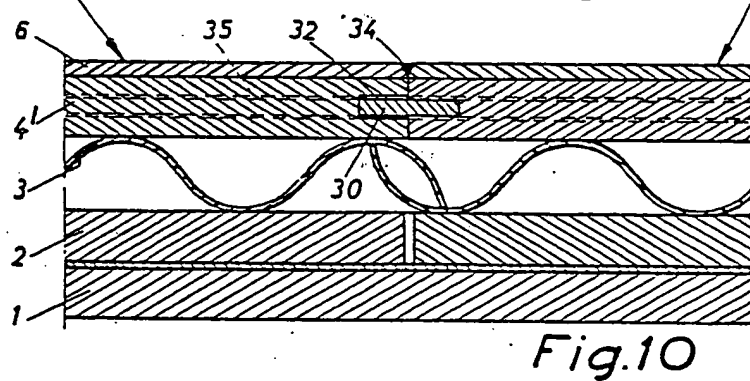
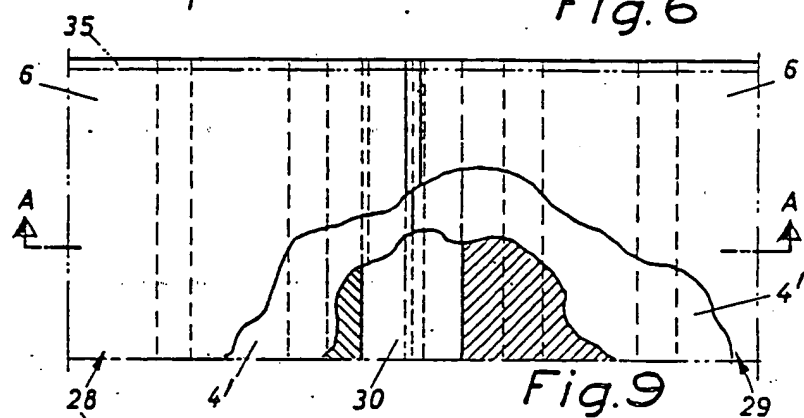
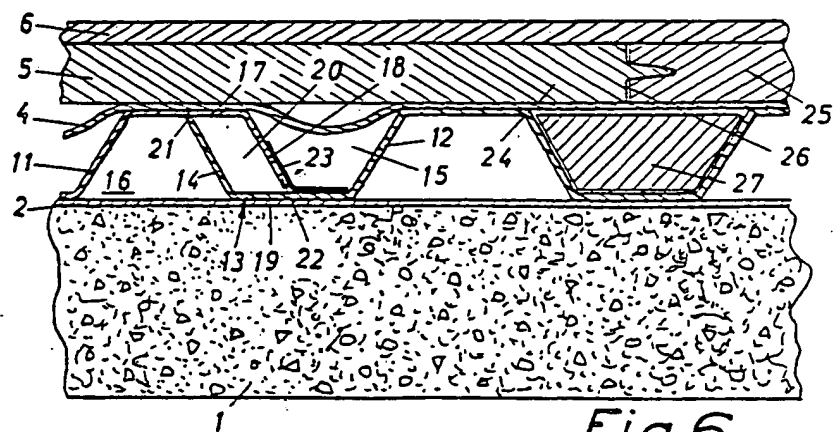


Fig.2







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COMPLETE SPECIFICATION

4 SHEETS

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Sheets 3 & 4



Fig. 5

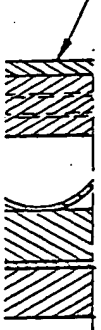
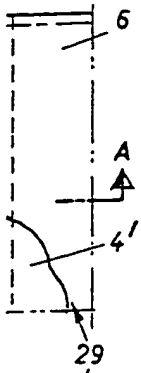


Fig. 7

Fig. 7

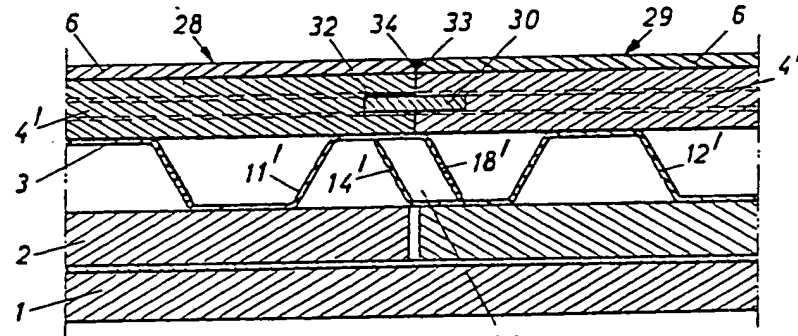
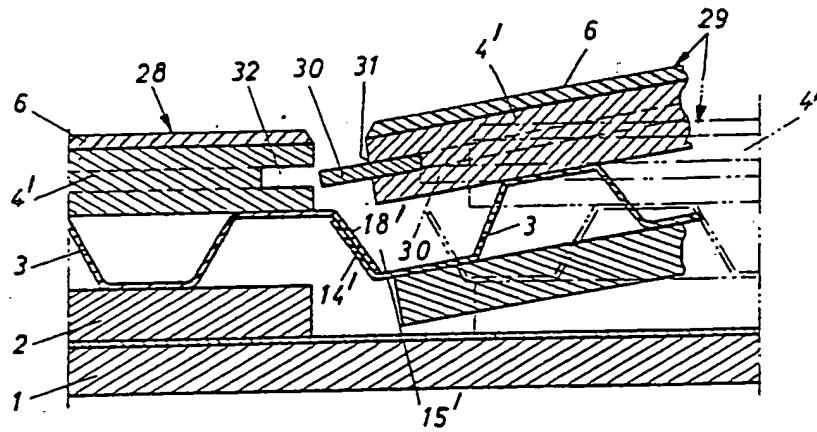


Fig. 8

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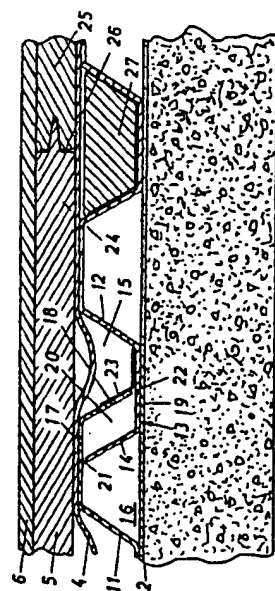


Fig. 6

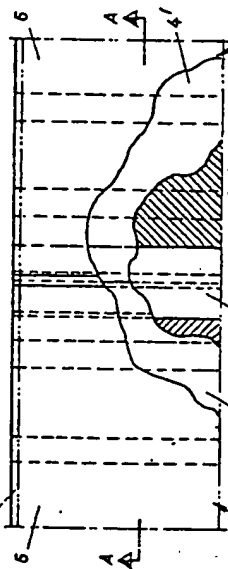


Fig. 7

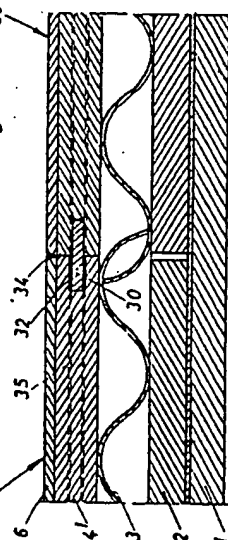


Fig. 8

Fig. 9

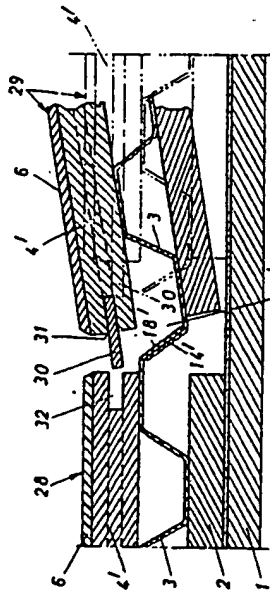


Fig. 10